

Georgia Experiment Station

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Bacterial Spot of Peach

By

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BACTERIAL SPOT OF PEACH

There has been an unusual outbreak of "bacteriosis" or "bacterial spot" of peach in some of the important peach growing sections of Georgia during the present season. This disease is nearly always present to some extent, but usually causes comparatively little damage on vigorous trees. Where the orchards are properly fertilized and cultivated the few spots or "shot holes" appearing on the leaves are usually overlooked or attributed to spray injury by the growers. This year, however, leaves, twigs, and fruits were severally attacked in many orchards where excellent culture and fertilization had been given from the time the trees were set.

Cause and Development of the Disease

The disease is produced by a minute plant organism, **Bacterium pruni**, which enters through the stomata or breathing pores present in the surface of all young growing parts of the peach leaves, twigs, and fruits. Once in contact with the moist tissue within the stomata the bacteria multiply and kill the neighboring cells, and a dark green water-soaked spot appears. After a day or two the spots change color. On leaves they become dark brown and may drop out, leaving a small hole resembling a shot hole. When many spots form on a leaf it turns yellow and drops from the tree. In severe attacks the trees may be almost completely defoliated. On the fruit the

spots become grayish or brown and, if numerous, cause the surface of the fruit to crack. Often where fruit infection is severe the fruits develop unevenly and become lopsided. Usually the spots do not extend more than one-eighth inch into the tissue of the fruit—often less. On twigs the spots turn brown with a reddish-brown border and often exude drops of gum. They may persist as perennial cankers.

The bacteria live over winter in the twig cankers and under certain conditions in the old fallen leaves. The most important source of spring infection seems to lie in the twig cankers.

Apparently the peach fruit is susceptible to attack for only a short period during early development. After the peach is about half grown it seems to be almost immune. This is probably due to the permanent closing of the stomata at this stage of growth; though this point has not been definitely determined.

The severe attacks noted this summer must be explained as the action of a combination of factors. The first of these factors is loss of vigor by the trees during the severe drought of 1925. In all the orchards examined infection was most severe on high ground grading off to very light infection in the low places. Second, lack of fungicide in the dormant spray. In every orchard where infection was severest miscible oil, without addition of a fungicide, was applied as the dormant spray. Third, a heavy rain accompanied by high wind occurred on the night of May 10th, just at the time when the fruit was most susceptible to bacterial infection. The wind-driven rain washed the dust and spray residues from the leaves and fruits and left them unprotected and at the same time moist for several hours.

The effect of the wind on infection could be seen quite distinctly in many orchards. Infection was always worse on the northwest side of the tree except on trees with very open tops. Often the branches on the northwest side of the tree were almost completely defoliated while the south and southeast branches had lost few leaves, as shown in figure 1. On the fruits spots were rarely found

BACTERIAL SPOT OF PEACH

other than on the side exposed toward the northwest. Wherever the trees were protected from the wind by tall timber or by buildings infection was very light.

Careful examination of several badly diseased trees showed old bacterial cankers on last year's growth. Indications are strong that bacteria from these old cankers produced the new infections. Doubtless a strong fungicide in the dormant spray would have killed the bacteria in many of these old cankers.

Control Measures.

For orchards where infection has been noticed this summer the following control measures are recommended:

1. Prune carefully to remove all cankered twigs and burn the prunings.
2. Turn the soil during the winter, covering the fallen leaves.
3. Use a fungicide in the dormant spray.
4. Fertilize heavily especially with nitrates to keep the trees growing vigorously.
5. Apply lime-sulphur spray instead of dust during the latter part of April and early May. The spray sticks better than dust during a driving rain. Apparently most of the bacterial infection occurs in this region early in May.

Lime-sulphur solution, winter strength, is a very good fungicide, but many peach growers are turning to the use of miscible oil as the dormant spray for the control of scale because it is cheaper and more easily applied. Oil is not effective against fungous and bacterial parasites. A marked increase in scab and leaf curl may be noted in orchards where miscible oil alone has been used as the dormant spray. By combining miscible oil with Bordeaux mixture a spray can be made that is effective against scale and also against fungi.

PREPARATION OF BORDEAUX-OIL SPRAY

Such Bordeaux-oil sprays are now being marketed by spray manufacturers; but they may be prepared by the grower at somewhat lower cost. For the dormant spray,

to be applied before the blossoms show pink, a 5-5-50 bordeaux plus two per cent oil is recommended. The materials needed per hundred gallons of this mixture are:

	Copper sulphate (bluestone)	10 lbs.
	Stone lime	10 lbs.*
Either {	Fish oil soap	2 lbs.
	or	
	Hard soap	1 lb.
	Oil (a cheap grade of lubricating oil)	2 gals.
	Water	100 gals.

A stock solution of each ingredient may be made in advance and mixed as needed. Slake 50 pounds of good stone lime in a barrel and add water to make 50 gallons. Dissolve 50 pounds of bluestone by suspending in a sack in 50 gallons of water. Dissolve the soap in 10 gallons of water in a wash boiler or other convenient vessel, add 20 gallons of oil and heat to boiling. While still hot emulsify by pumping the solution into itself for a few minutes. This stock solution is sufficient to make 1000 gallons of spray.

To make a 100-gallon tank of spray mixture measure 10 gallons of the lime suspension into a 50 gallon barrel and add water to make 50 gallons. Into another barrel measure 10 gallons of the bluestone solution and add water to make 50 gallons. Pour the diluted lime and bluestone solutions together through a strainer into the spray tank. Add three gallons of the oil emulsion and mix by pumping the solution into itself a few minutes. The solution should be applied at once. Some of the ingredients will settle out if allowed to stand overnight.

Most of the miscible oils marketed for spraying purposes will mix perfectly with bordeaux and may be added as directed for the home-made oil emulsion.

*Fifteen pounds of hydrated lime may be used in case a good grade of stone lime is not available.

BACTERIAL SPOT OF PEACH

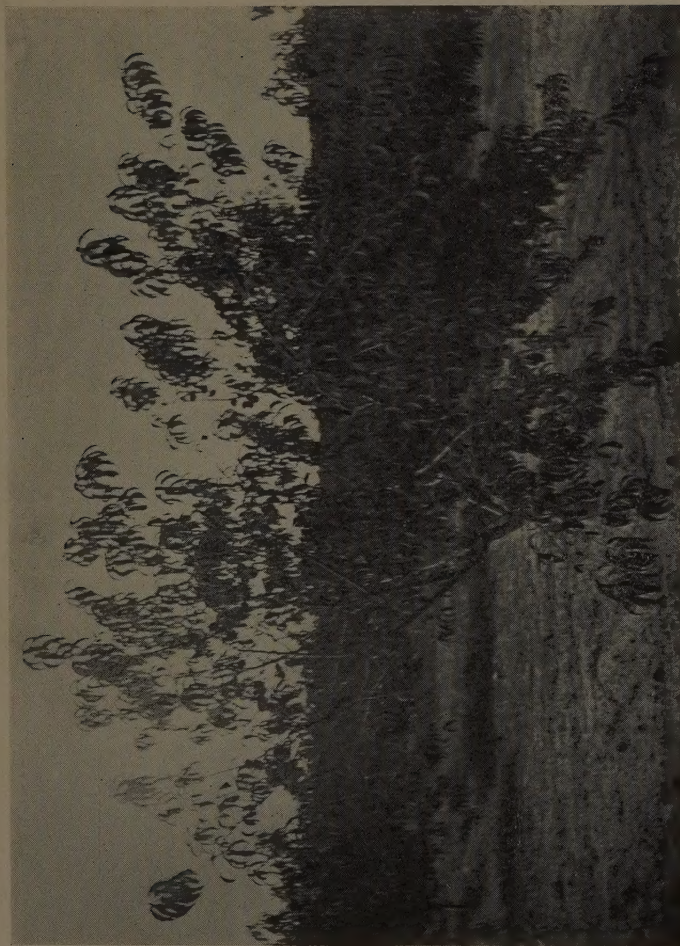


Figure 1. Four year old Elberta peach tree with branches on northwest (left) side almost completely defoliated by bacterial spot, *Bacterium pruni*.
Photographed July, 1926.

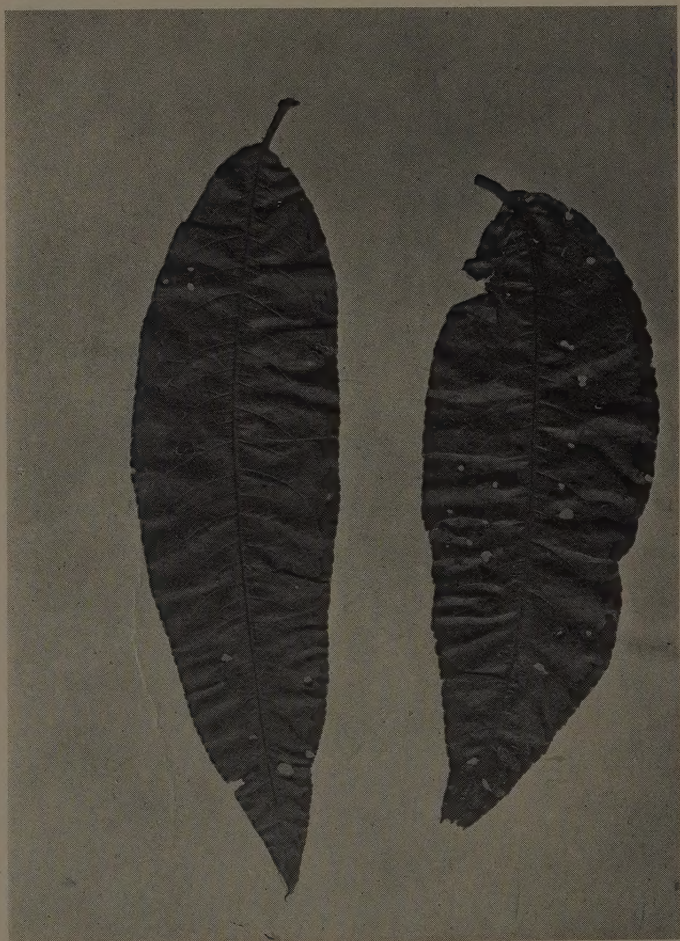


Figure 2. Peach leaves showing spots and "shot hole" produced by *Bacterium pruni*. Natural size.

BACTERIAL SPOT OF PEACH

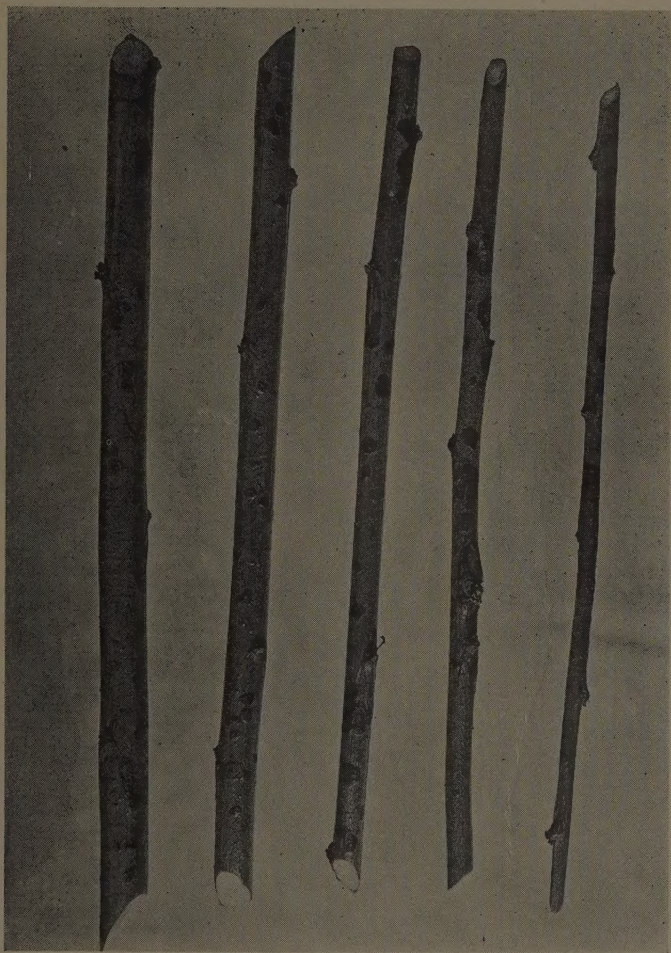


Figure 3. Peach twigs showing spots produced by *Bacterium pruni*. Natural size.

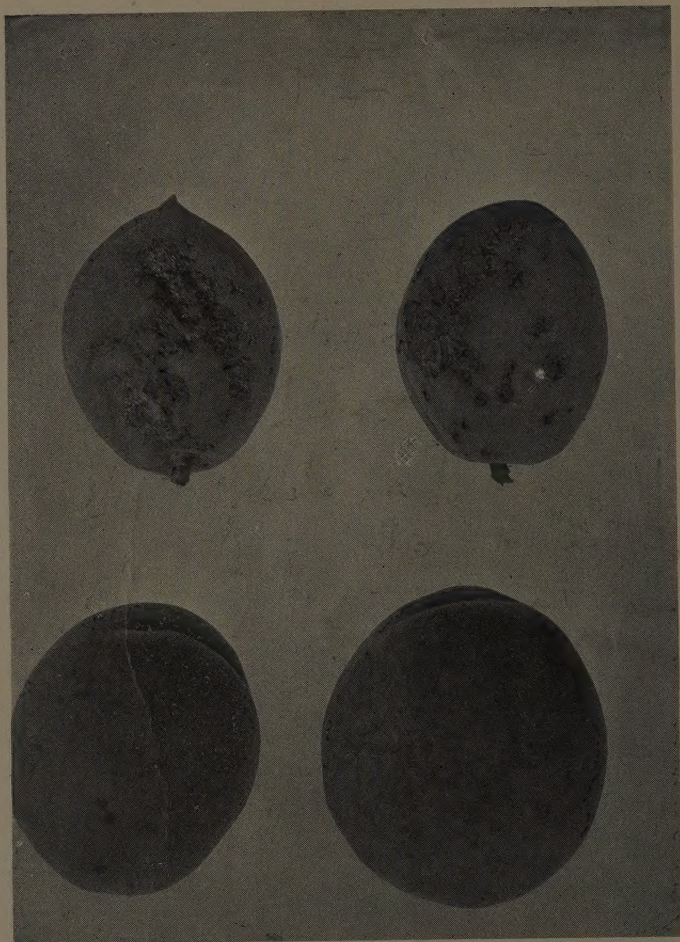


Figure 4. Elberta peach fruits affected with bacterial spot, *Bacterium pruni*; upper two showing numerous small spots, lower two with larger and deeper type of spots cracking. Natural size.

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